

Amendment and Response

Applicant: Michael Bauer et al.

Serial No.: 10/565,259

Filed: October 17, 2006

Docket No.: I431.145.101/FIN606PCT/US

Title: SUPPORT WITH SOLDER BALL ELEMENTS AND A METHOD FOR POPULATING SUBSTRATES
WITH SOLDER BALLS

IN THE CLAIMS

Please cancel claims 19-24 and 37.

1.-24. (Cancelled)

19. (Previously Presented) A support with solder ball elements for loading substrates with ball contacts, the support comprising:

a layer of adhesive applied on one side, the layer of adhesive comprising a thermoplastic or thermosetting material, the adhesive force of which is reduced when irradiated; and

solder ball elements which are arranged closely packed in rows and columns on the layer of adhesive in a prescribed minimally permissible pitch for a semiconductor chip or a semiconductor component.

20. (Previously Presented) The support according to claim 19, comprising wherein the substrate to be loaded is a semiconductor wafer, and the support includes an arrangement pattern for flip-chip contacts of a multiplicity of semiconductor chips of the semiconductor wafer.

21. (Previously Presented) The support according to claim 19, comprising wherein the substrate to be loaded is a semiconductor chip, and the support includes an arrangement pattern for flip-chip contacts of the semiconductor chip.

22. (Previously Presented) The support according to claim 19, comprising wherein the substrate to be loaded is a printed circuit board of a panel, and the support includes an arrangement pattern for ball contacts of a multiplicity of semiconductor components of the panel.

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23. (Previously Presented) The support according to claim 19, comprising wherein the substrate to be loaded is a wiring support of a semiconductor component, and the support includes an arrangement pattern for external contacts of a semiconductor component.

24. (Previously Presented) The support according to claim 19, comprising wherein the substrate to be loaded is an intermediate wiring board of a semiconductor component stack, and the support includes an arrangement pattern for stack contacts of a semiconductor stack component.

25. (Previously Presented) A system for loading substrates with solder contacts, the system comprising:

a support with a layer of adhesive on one side, the layer of adhesive comprising a thermoplastic or thermosetting material, the adhesive force of which is reduced when irradiated;

solder ball elements arranged closely packed in rows and columns on the layer of adhesive in a prescribed minimally permissible pitch for a semiconductor chip or a semiconductor component;

an irradiating device with a source of radiation and apparatus for selectively irradiating the support to reduce the adhesion of the layer of adhesive for loosening solder ball elements at prescribed positions;

a removal device for removing the loosened solder ball elements and leaving solder ball elements in an arrangement pattern for flip-chip contacts or ball contacts;

a loading device for fixing the solder ball elements remaining on the support in a prescribed arrangement pattern on contact areas of the semiconductor wafer or semiconductor chip or the wiring support for semiconductor components; and

a pulling-off device for pulling the supports off the ball contacts.

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26. (Withdrawn) The system according to claim 25, comprising wherein the irradiating device includes a laser beam source and comprises deflecting devices for scanning the laser beam for selectively irradiating the support at prescribed positions.

27. (Previously Presented) The system according to claim 25, comprising wherein the irradiating device includes a UV source and, for selectively irradiating the support with UV rays, a mask holder with masks for UV irradiation of the support at prescribed positions.

28. (Previously Presented) The system according to claim 25, comprising wherein the removal device for removing the loosened solder ball elements includes a roller or a continuous tape, which are provided with tacky surfaces on which loosened solder ball elements remain adhesively attached.

29. (Withdrawn) The system according to claim 25, comprising wherein the removal device for removing the loosened solder ball elements includes a roller or a continuous tape on the upper sides of which stripping bristles are provided.

30. (Previously Presented) The system according to claim 25, comprising wherein the loading device includes a holder for substrates to be loaded and a support holder for the support with an arrangement pattern of solder ball elements, as well as adjusting means for aligning the remaining solder ball elements of the support in the support holder with contact areas of the substrates to be loaded of the holder.

31. (Previously Presented) A method for loading substrates with solder ball contacts, comprising:

producing a tape from support material with a layer of adhesive on one side, comprising a thermoplastic or thermosetting material, the adhesive force of which is reduced when irradiated;

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arranging solder ball elements in rows and columns on the layer of adhesive in a prescribed minimally permissible pitch for a semiconductor chip or for a semiconductor component;

selectively irradiating the support to reduce the adhesion of the layer of adhesive and loosen solder ball elements at prescribed positions;

removing the loosened solder ball elements and leaving solder ball elements that are fixed on the support in an arrangement pattern for a semiconductor chip or for a semiconductor component;

soldering the solder ball elements remaining in a predetermined arrangement pattern on the support onto contact areas of a semiconductor wafer or semiconductor chip or wiring support for semiconductor components; and

pulling the support off the substrate to be loaded with flip-chip contacts or ball contacts.

32. (Previously Presented) The method according to claim 31, comprising spraying the support on one side with a layer of adhesive.

33. (Previously Presented) The method according to claim 31, comprising adhesively attaching the solder ball elements onto the layer of adhesive in rows, from dispensing nozzles arranged in parallel next to one another, in a prescribed minimally permissible pitch for a semiconductor chip or a semiconductor component.

34. (Withdrawn) The method according to claim 31, comprising wherein a laser beam for selectively irradiating the support to reduce the adhesion of the layer of adhesive and to loosen solder ball elements at prescribed positions is passed over the support.

35. (Previously Presented) The method according to claim 31, comprising wherein the support is selectively irradiated with UV rays through a mask to reduce the adhesion of the layer of adhesive and to loosen solder ball elements at prescribed positions.

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36. (Previously Presented) The method according to claim 31, comprising subjecting the support to irradiation over a large surface area, and the support is pulled off the ball contacts.

37. (Cancelled)